

ABSTRACT

A method and apparatus for cleaning, rinsing and Marangoni drying substrates is provided. A line of fluid is sprayed along a substrate surface forming an air/fluid interface line, and a line of drying vapor is supplied to the interface line to achieve Marangoni drying. Thus, a large portion of the substrate is simultaneously dried. A preferred apparatus employs a tank of cleaning and/or rinsing fluid. Above the tank fluid a source of rinsing fluid directs rinsing fluid to the surface of a substrate forming a meniscus on the substrate surface as the substrate is lifted from the cleaning fluid, and a drying vapor source directs drying vapor to the meniscus. The drying vapor lowers the surface tension of the meniscus, inducing a Marangoni flow of rinsing fluid from the substrate's surface, and thereby drying the substrate. The cleaning fluid tank has a substrate receiving and cleaning portion and a substrate rinsing portion. The rinsing fluid source and the drying vapor source are enclosed by a drying enclosure above the rinsing portion of the tank. Thus, substrate loading, cleaning, rinsing, drying and unloading are performed with at least partial overlap in time.